RAILWAY SAFETY

Working for a safer railway

SAFETY JUSTIFICATION **ISSUE: 1**

DOCUMENT INFORMATION

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PART 1 – SCOPE OF SAFETY JUSTIFICATION

This safety justification covers all the requirements contained in GE/RT8035 – Automatic Warning System (AWS) which have been drawn from:

GK/RT0364 - Requirements for the Automatic Warning System and
GK/RT0016 - Automatic Warning System of Train Control (AWS)

The document effectively eliminates inconsistencies between the two existing documents, and resolves non-compliances raised in connection with TPWS and new trains.

GK/RT0016 and GK/RT0364 will be withdrawn when GE/RT8035 is issued.

Additionally, the new standard defines availability and mandates the achievement of 99.9% availability for AWS equipment. This is the only risk control measure that has been introduced in the development of the RGS, although it should be noted that this is currently being comfortably achieved by the railway industry (see AWS Availability CBA attached).

PART 2 – RISKS BEING CONTROLLED

The primary risks being controlled are those associated with train collision and derailment caused by signals being passed at danger (SPADs). These are significant train accidents which have the potential for multiple fatalities. The frequency of such accidents has reduced dramatically since the 1950s (when AWS was first introduced) and AWS is credited with much of this improvement in safety.

Even with the introduction of TPWS, AWS is considered an essential element in train protection and it is essential that its use and maintenance are subject to strict control.

It should be noted that the detailed requirements for the provision of AWS track equipment for speed reductions are contained in GK/RT0038, not GE/RT8035.

PART 3 SUMMARY OF CONTROLS

GE/RT8035 mandates controls on:

1. The lines that need to be fitted with AWS, together with the type, performance, configuration and location/application of magnets fitted on the track, and their control by the signalling system.
2. The trains that need to be fitted with AWS, together with the type, positioning and functionality of trainborne AWS equipment.
3. Requirements for system integrity, including availability, failure modes, electromagnetic compatibility and interfaces.

The most significant new control mandated by the document is the inclusion of a 99.9% availability target for both track and train-borne equipment. Analysis has been done, based on failure data, which indicates that in practice this target is (on average) comfortably exceeded by both existing infrastructure and existing rolling stock. It does not, therefore, impose any additional cost on the industry. The use of an availability target (as distinct from a reliability target) means that both the AWS equipment design and the arrangements for taking AWS equipment out of service and repairing it have to be considered.

There is potentially an inconsistency between the 99% availability required of TPWS (see GE/RT8030) and the 99.9% proposed for AWS, if the two systems share common equipment (as is the case with the logic unit of the Redifon equipment). A 99% availability target for AWS would not be sufficient. In practice this may not be a problem since, as the Appendix to GE/RT8030 makes clear, in practice TPWS equipment needs to achieve an availability exceeding 99.9% in order to enable a sufficiently reliable train service to be provided.

99.9% has been selected as being an achievable and suitable safety target (it equates roughly to each train being in service with failed AWS equipment for approximately 4 hours a year (based on trains being in service 12 hours per day throughout the year), and to each set of AWS track equipment being out of service (failed) for approximately 8 hours a year (based on equipment being in service 24 hours per day throughout the year).

PART 4 – COSTS AND BENEFITS

In specifying the 99.9% availability, no additional costs are envisaged as this figure is already being achieved. However, there may be cost implications for demonstrating compliance.

The benefits are that we know that 99.9% provides effective risk mitigation (and that little would be gained by a more onerous requirement). Specifying 99.9% formalises the requirement and will help to maintain standards (and prevent deterioration).

The changes are, in the main, the bringing together of two existing standards and the clarification of some measures where overlaps/contradictions currently exist. No significant additional costs are envisaged for the Railway Group as a result of the introduction of this standard.

PART 5- CONCLUSIONS

This standard is required in order to clarify conflicting requirements that exist between GK/RT0016 and GK/RT0364, and to specify a 99.9% availability target for AWS equipment.

AWS is a significant mitigator of the risk associated with collisions and derailments as a result of SPADs and overspeeding. The measures contained within GE/RT8035 are largely unchanged, and the additional costs to Railway Group members are therefore not significant. On this basis the standard is considered justified.